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Buyout Option & Reserve Price in Online Auctions: Should I Bid or Buy Out?

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Abstract

This article examines the influences of two forms of buyout options – permanent (i.e., a buyer could buy out the item at any point during the entire bidding process) and temporary (i.e., buyout option ceases to be present once the bidding price exceeds the reserve price) – under the presence of reserve price on a buyer's decision in online auctions. We propose that the presence of permanent buyout option leads a buyer to buy out instead of bidding. However, a buyer with temporary buyout option would attempt to bid above the reserve price so as to prevent other buyers from ending the auction prematurely. A series of controlled experiments was subsequently conducted to investigate the impact of buyout permanence (permanent versus temporary), price contrast (small versus large difference between the average clearance price and buyout price) and reserve price (low versus high) on a buyer's behavior. The results support our conjecture by suggesting that a buyer is more likely to be loss averse and has a higher propensity to buy out in the presence of the permanent buyout option. However, when facing the temporary buyout option, a buyer becomes reserve-price conscious and is more likely to bid.

Keywords: Online auctions, buyout option, reference price

Introduction

Online auction traditionally suffers from two drawbacks compared to posted-offer Web sites (e.g. Amazon): price uncertainty and tedious bidding process (Gupta and Gallien 2005). With the purpose of rendering online auctions to be more attractive to buyers, two of the most popular online auction Web sites, Yahoo!Auction and eBay¹, introduced a new feature known as buyout option in late 1990s (Budish and Takeyama 2001; Lou and Zhong 2003). With buyout options, buyers could bypass the hassle of bidding and obtain an auctioning item immediately at the posted price (i.e., buyout price)² (Lucking-Reiley 2000). Augmented with this option, online auctions cater to wider variety of

¹ Yahoo!Auction terms the buyout option *Buy-Now* and eBay calls it *Buy-It-Now*. Other Web sites offering buyout option include Amazon (terms it as *Take-It*) and uBid.com (terms it as *uBuy It!*).

² A more general term for buyout price is posted price. This study uses buyout price in the rest of the paper as we seek to be closer to the context of investigation (i.e., online auction).

buyers, ranging from price-sensitive buyers to effort-sensitive buyers (i.e., those who prefer to procure at the buyout price). Indeed, the buyout option is a huge success in online auctions. For instance, in the fourth quarter of 2004 alone, sales from buyers who exercised buyout (i.e., main contributor of fixed income trading) contributed three billion dollars, or 37% of eBay's gross annual merchandise sale³. These observations trigger a question: what prompts a buyer to buy out?

In our view, whether a buyer chooses to buy out will depend on how the buyout option is framed and evaluated relative to other auction parameters (e.g. starting price) (Tan, Xue, Teo and Lin 2005). To this end, there are two categories of buyout options depending on whether reserve price (i.e., the lowest price that a seller is willing to sell the item) is present. The first category refers to the buyout options in the absence of reserve price. Within this category, two types of buyout options exist depending on the duration in which the options are available. The first type is the *permanent* buyout option that enables a buyer to choose to buy out at any point in time during the entire auction process (Budish and Takeyama 2001). This form of buyout option is commercially implemented by Yahoo! Auction. The second type is the temporary buyout option that ceases to exist once the first bid is received. We call this type of buyout option as *one-time* buyout (Mathews and Katzman 2006). The second category of buyout options denotes the buyout conditions where reserve price is present. Similar to the first category, there are two types of buyout options. The first type is the *permanent* buyout option that is available throughout the entire auction process (Budish and Takeyama 2001). The second type is the *temporary* buyout option that ceases to be available when any submitted bid meets or exceeds the reserve price. *Temporary* buyout option is available at eBay.

To our knowledge, most of the extant studies focus on the examination of the effects of buyout option on the welfare of buyers and sellers (Mathews 2003), the pricing strategy (Kirkegaard and Overgaard 2003; Gupta and Gallien 2005), and the buyer's risk perceptions (Mathews and Katzman 2004). For instance, in an analytical study conducted by Mathews (2004) to examine *one-time* buyout option, the author concludes that when auction participants (i.e., buyers and sellers) make no distinction as to when an auction transaction occurs, the seller would tend to choose a high buyout price to deter buyers from exercising the option. However, when both sellers and buyers are impatient, the sellers could offer low buyout price so that the option is exercised with positive probability. In another study conducted by Gupta and Gallien (2005) on the comparison between *one-time* and *permanent* buyout options, the authors observe that buyers who exercise buyout option will tend to do so immediately upon their arrival. In contrast, buyers who prefer to bid will do so immediately upon arrival for *one-time* buyout option, but they will delay bidding in *permanent* buyout option condition. Most of these researches focused on developing analytical models to deduce the impact of buyout option on economic variables such as welfare and surplus (e.g. Gupta and Gallien 2005; Kirkegaard and Overgaard 2003). A primary concern we have with these studies is that it is difficult to determine a bidder profile (e.g. risk propensity) ex ante. To this end, this study seeks to complement prior studies with empirical substantiation and to answer the question of: besides bidder profile, *how can a seller know a priori what prompts a bidder to choose to buy out?*

One study that is closer to this research is the work by Tan and his colleagues (2005). In that study, the authors conducted laboratory experiments to compare the influence of *one-time* and *permanent* buyout options on buyers' propensity to buy out. They observe that when the *permanent* buyout option is available, a buyer is more likely to exhibit loss aversion characteristics and prefers to adopt the buyout strategy. However, in the presence of the *one-time* buyout option, the thought that one could avoid the premature ending of the auction by exercising the bidding option at the start decreases a buyer's preference for adopting a buyout strategy.

Despite the increasing volume of papers on buyout option, much of the extant research focuses on the *one-time* buyout option, the *permanent* option, or a comparison between the two buyout options (Tan et al. 2005; Mathews 2004). There is a severe lack of knowledge on the third form – *temporary* – buyout option (Bertomeu and Mathur 2006). To the extent that sellers have a great propensity to delineate reserve price to ensure a minimum transaction price (Greenleaf 2004), the presence of a buyout option could complicate the whole decision-making process. Indeed, recent auction research has begun to discern the complex role of auction information in influencing a buyer's perceptions and decisions. For instance, by setting a low buyout price, potential buyers are more likely to choose to buy out than to bid since the returns from bidding may not justify for the cost of bidding (i.e., effort). However, by setting a high buyout price, potential buyers may not necessary perceive a higher utility to bid. This is because the buyer may suffer from a constant "danger" that any other buyer can buy out, and the buyer who chooses to bid will

³ Source: <http://investor.ebay.com/>; http://www.propertyolutions.com/Home/Company/Industry_News/Articles/283 (last accessed: Aug 07, 2006)

immediately lose. Extending such observations to our context, one would agree that a buyer is not certain that he or she will obtain the product through bidding if a reserve price is set. In this light, it is likely that a buyer could buy out when facing a reserve price. Regardless of the conjecture that requires further empirical validation, we could conclude that a decision to buy out may involve more complex mental computation and simulation than many would have expected.

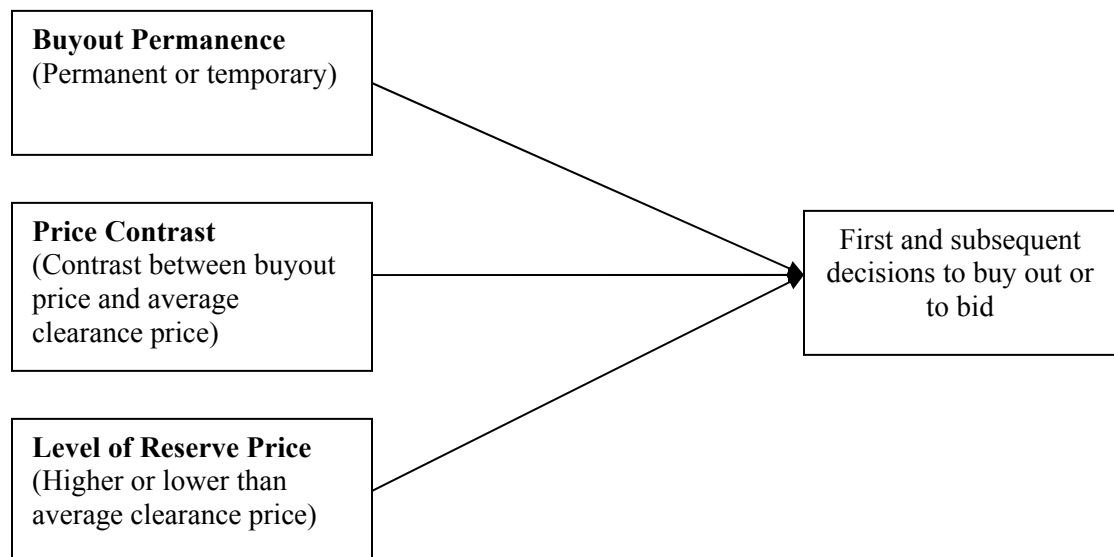
As a step toward enhancing our understanding of buyout option and reserve price, this research investigates the buyer's reaction toward buyout option in the presence of reserve price. Specifically, we conducted a series of experiments to examine the influence of buyout option, reserve price, and price gap on a buyer's propensity to buy out. We explicitly consider and operationalize price gap as the difference between the buyout price and average clearance price (as reference price) for one reason: a buyer often mentally computes and compares the expected returns from buying out and bidding based on the price parameters. To the extent that many sellers often offer relatively low starting prices to attract buyers (Lucking-Reiley 2000), a buyer has to estimate the expected difference in returns between buying out and bidding.

In our view, one piece of external price information that buyers could rely on is the average clearance price of similar products, which could be obtained from external auction sources (e.g. intermediaries that seek to assist buyers in bidding such as auctionwatcher.com) (Roth and Ockenfels 2000). Furthermore, the inclusion of a low starting price and unknown reserve price adds to the dilemma by making it, simultaneously, more attractive to bid (due to the low starting price) and attractive to buy out (avoids the hassle of meeting the reserve price). The propensity to buy out is modeled and measured in two stages: (1) a buyer's first decision to choose between a bidding strategy and a buyout strategy, and (2) the subsequent procurement decisions (i.e., to bid or buy out). The rationale for doing so is that a buyer could have undergone multiple decision points during an auction in which a buyout strategy could be exercised (Ariely and Simonson 2003). The results suggest that a buyer is more likely to be loss averse and has a higher propensity to buy out in the presence of a *permanent* buyout option. However, when facing a *temporary* buyout option, a buyer becomes reserve-price conscious and is more likely to bid.

Research Model and Hypothesis

Figure 1 depicts the theoretical framework underpinning this research. We propose that the decision to buy out depends on not only the type of buyout option (temporary or permanent) but also on the price gap (the contrast between the buyout price and the average clearance price) and the level of reserve price. As the types of buyout option vary according to the duration of its existence, we term the types of buyout option as buyout permanence.

Figure 1. Theoretical Framework



Buyout Permanence

There are two theorizations of a buyout option's impact on a buyer's behavior. One perspective suggests that a buyer could be encouraged by the mere awareness of an opportunity to win even without much deliberation (i.e., to bid diligently). Consequently, a buyer's incentive to buy out is enhanced (Lou and Zhong 2003). Another perspective dictates that a buyer makes an explicit trade-off between the propensity of being outbid (in the case of bidding) and propensity of overbidding (in the case of buy out) and endures the decisional consequences (Tan et al. 2005; Mathews 2004). Consequently, a buyer's decision to buy out and to bid could differ depending on the characteristics of the buyout option.

Applying the second perspective, Lou and Zhong (2003) observe that motivation is lacking for a buyer to buy out unless the bidding price increases to the point that it is close to the buyout price. Indeed, a buyer could acquire an auctioning item with a lower-than-buyout price through bidding if her rival buyers exit the auction early. In this regard, one is less likely to exercise buy out if the buyout option is permanently available.

However, in another study by Tan and his colleagues (2005), they observe that in a *permanent* buyout auction, a buyer is more motivated to buy out than in a *one-time* buyout setting (albeit one that has no reserve price). This was attributed to loss-averse buyer behavior. Loss aversion refers to the tendency for a person to strongly prefer avoiding losses (i.e., not winning the item) over obtaining gains (i.e., lower acquisition price) (Kahneman and Tversky 1979). When a buyer is offered a *one-time* buyout option, she would be more likely to bid, as the buyout option would cease to exist once the first bid is received. Such a move would not only eliminate the occurrence of premature ending of the auction but also signal to other buyers the commitment of this buyer in acquiring the item.

While this study focuses on the *temporary* buyout and Tan et al. (2005) examine the *one-time* buyout option, to the extent that both studies anchor on the comparison with the *permanent* buyout option, we believe that the buyers' propensity to exhibit loss aversion in that study would persist in our own experiment. In other words, a buyer with *permanent buyout option* would have a higher inclination to buy out, but a bidder with a *temporary* buyout option would have a higher propensity to bid.

In the case of the *permanent* buyout option, *permanent* buyout is available not exclusively to one but all buyers, and it is plausible that any buyer could also exercise buyout before the rest could react. When this thought surfaces, a buyer could breed upward counterfactual thinking⁴ ("if only I chose buy out earlier on") and hence perceive the choice of buyout right at the beginning to be more attractive.

Comparatively, in the *temporary* buyout option condition, when a buyer chooses to bid, the buyout option will cease to be present once the bidding price reaches the reserve price. This leads to the elimination of possible unfavorable outcomes resulting from other bidders exercising the buy out (i.e., premature ending of an auction). By taking this into consideration, a bidder has fewer compelling reasons to buy out. Furthermore, by choosing to bid, a buyer could signal to other on-looking buyers the commitment of this buyer in acquiring the item. This, hopefully, would deter some buyers, thereby reducing competition among potential buyers. Even in the event that this buyer fails to acquire the item due to the existence of buyers with a higher valuation or acquire the item at a price higher than the buy price, a buyer would generate downward counterfactual thinking ("at least I tried"), which induces positive view of bidding (Luce et al. 1999).

Essentially, in an attempt to eliminate the threat that rival buyers would exercise the buyout option in a *permanent* buyout auction, we speculate that the buyers would be driven to exercise the buyout option before rival buyers could use it themselves. Conversely, it is our contention that in the *temporary* buyout auction, the buyers would try to reach the reserve price to prevent other buyers from ending the auction prematurely. However, this may be more difficult to achieve than in a *one-time* buyout auction observed by Tan et al (2005), given that the reserve price is hidden from the buyers. In this light, we contend that the behavior due to the buyout permanence in the first decision as suggested earlier would persist in the subsequent decisions as well. The rationale is that in the subsequent decisions, for the *temporary* buyout auction, the chances of meeting the reserve price (therefore eliminating the buyout option) have increased while the threat of losing out to a rival buyer due to buyout in a *permanent* buyout auction remains in subsequent decisions.

⁴ According to counterfactual thinking principle, a buyer will simulate how a choice of one option (e.g. to bid) could result in different subsequent outcomes. The assumption behind this principle is that mental simulation of what would and should happen allows a buyer to have a better appreciation of the consequences of the options before making a decision (Luce et al. 1999).

Hypothesis H1a: *In the first decision, a permanent buyout option will elicit a higher propensity to buy out compared to a temporary buyout option.*

Hypothesis H1b: *In subsequent decisions, a permanent buyout option will elicit a higher propensity to buy out compared to a temporary buyout option.*

Price Contrast

Price contrast refers to the difference between the buyout price and the average clearance price of the product (i.e., reference price). The theoretical rationale for including the average clearance price can be categorized into two broad forms (Mazumdar et al. 2005). First, according to adaptation-level theory, people judge a stimulus relative to the level to which they are being adapted. Thus, in a price contrast context, the expectation-based reference price is the adaptation level against which other price stimuli (i.e., buyout price) are judged. Second, buyers often construct a normative standard in which a product is judged to be “fair” or “just” to be procured at the prevailing price. This standard is often based on what other buyers pay for the same or similar product (Mezias et al. 2002).

The impact of external reference price (i.e., average clearance price in our context) on buyer purchase decisions is profound (see Putler 1992). For instance, Kopalle and Lindsey-Mullikin (2003) observe that when there is no difference between the external reference price and a buyer’s initial price expectation, one is more likely to exhibit a significant downward shift in price expectations. However, a buyer’s price expectation increases when the external reference price is higher than the initial expectations. On the other hand, when the external reference price is lower than the initial price expectations, a buyer’s price expectation is negative. What we can derive from this discussion is that the strength of the external reference price could enhance or reduce a buyer’s perceptions of value.

Relating external reference price to our context, with the average clearance price acting as an external reference price for the buyers, they could then consider whether the buyout price stated is a bargain for them to pursue (Mazumdar et al. 2005). We assume the buyout price to be always higher than the average clearance price, as sellers would act to maximize their profits. Should the buyout price be perceived by a buyer to be very close to the average clearance price, he or she should be more inclined toward buyout since the buyout option protects him or her from paying above a certain price value (Putler 1992). This lowers the risk of losing the item and reduces the effort of bidding. In addition, a small price difference may be perceived by the buyer that bidding may easily reach a price level close to the buyout price should she or someone else bid close to the average clearance price. In that case, one would more likely to buy out to avoid paying over the buyout price. On the other hand, should the gap between the buyout price and the average clearance price be perceived by a buyer to be large, he or she is more likely to perceive the action of buyout to be less attractive, since the large price gap allows more room for bidding to occur without getting too close to the buyout price (Mazumdar et al. 2005).

In subsequent decisions, the price contrast between the buyout and average clearance price remains unchanged, though the gap between the current bid price and the buyout price would naturally shrink. However, given that our focus is on the price contrast between the buyout price and the average clearance price, we contend that the behavior for the subsequent decisions to be similar to the behavior in the first decision. That is, a small price contrast between the buyout and the average clearance price induces the buyer to choose buyout rather than to bid in order to avoid paying over the buyout price. This is more likely to be so in a small price contrast situation.

Hypothesis H2a: *In the first decision, a high price contrast condition will elicit a lower propensity to buy out compared to a low price contrast condition.*

Hypothesis H2b: *In subsequent decisions, a high price contrast condition will elicit a lower propensity to buy out compared to a low price contrast condition.*

Reserve Price

Reserve price is the minimum offer price acceptable to the seller. A reserve price is private information; the buyers are aware of such price existence, but the actual amount is not known. Usually when the auction is in progress, the use of a reserve price will be indicated and the message changes from “*the reserve price has not yet to be met*” to “*the reserve price has been met*” when a bid meets or exceeds the reserve price (Lucking-Reiley, 2000). In the event that no bid meets the reserve price at the end of the auction, the item will go unsold.

A reserve price benefits a seller in one way: it allows a seller to protect her interests of selling the item at below the threshold price (Lucking-Reiley, 2000). When a buyer perceives the reserve price to be high (with respect to average clearance price), he or she would presume a smaller surplus to be earned through bidding (i.e., buyout price – reserve price). The effort to bid is very likely to outweigh the possible surplus gained through bidding. When such an estimation or belief is formed, it is plausible that the buyout strategy will be perceived to be more favorable. In this light, we consider the reserve price to be high or low depending whether it is higher or lower than the average clearance price.

In relation to the decision to buy out, while the true value of the reserve price may not be known to a buyer, she may attempt to estimate the reserve price based on her experience from previous auctions. If a buyer generally faced auctions that have reserve prices set at above the average clearance price, she is very likely to have an inclination to buy out for the very first decision even though there is no obvious reason to believe that there is any relationship between the reserve price of previous auctions and that of this auction. In other words, should the reserve price be consistently higher than the average clearance price and should this be suspected by the buyer, a buyer is more inclined to buy out (Mazumdar et al. 2005).

As an auction progresses, a buyer may have better grounds for believing whether the reserve price is higher or lower than the average clearance price. This is because the price difference between the current bid price and the buyout price would decrease as more bids are being placed. If a buyer bids at the average clearance price and “*the reserve price has not yet to be met*”, one would believe that a smaller surplus could be expected if a bidding strategy is persisted. In this regard, buyout strategy would be a better choice.

Hypothesis H3a: *In the first decision, a high reserve price condition will elicit a higher propensity to buy out compared to a low reserve price condition.*

Hypothesis H3b: *In subsequent decisions, a high reserve price condition will elicit a higher propensity to buy out compared to a low reserve price condition.*

Research Methodology

This study employs the two (price contrast: high and low) by two (buyout permanence: *permanent* and *temporary*) by two (level of reserve price: high and low) factorial design (i.e., $2 \times 2 \times 2$) in a series of between-subject experiments. The objective is to examine the impact of decision characteristics (price contrast, buyout permanence, and reserve price) on decisions (first and subsequent) to buy out.

We developed an auction program that followed the popular online auction mechanics of proxy bidding. To rule out key alternative explanations to the experiment results, we observed strict enforcement of controls. For instance, individual characteristics, such as the age, gender, auction experience, and skills of the participants, which could potentially affect the decision-making process and outcome, were controlled for by randomization. Statistical tests were conducted and the results indicated no significant difference for participants in all eight treatments in terms of age, gender, online auction experience, and computer skills. Table 1 depicts the additional controls.

Table 1. Controls for Alternative Explanations of Results

Confounds	Impact	Remedy
Intrinsic risk tolerance level	Participant who is more likely to be a risk-taker will perceive bidding to be more favorable than buyout. Such preference could heighten perceived satisfaction from bidding.	Risk propensity would be measured through self-reporting. It would be used as covariate during data analysis.
Price range (i.e., number effect)	Participant may perceive a decision for a product of above \$200 to be more risky than that for a product below \$50.	Three pre-experiment sorting sessions were conducted to categorize the prices downloaded from eBay into high and low. During the experiment, each participant would make decisions for both categories of products.
Prior knowledge	Participants with prior experience could amplify the task-induced experience.	The participants recruited would be screened for previous trading and online buying experience.
Incentive	Inadequate incentives will not motivate a participant to take the decision seriously.	Monetary payoff was tagged to the participants' decisional performance.

Prior to the actual auction experiment, we conducted two pilot tests. The first test aimed to classify the price parameters into low or high price contrast categories. For instance, a set of price parameters of \$20 buyout price, \$18 average clearance price, and \$0.50 bid increment would be deemed as low price contrast compared to another set of price parameters of \$20 buyout price, \$5 average clearance price, and \$0.50 bid increment. Nine information systems (IS) graduate students pursuing doctorates who were cognizant of online auctions were recruited to sort through the price data collected from eBay auctions into categories. They based the categorization on average clearance price (i.e., a reference price to be displayed to the participants), buyout price, and bid increment. The second pilot test gauged another nine participants' responses to the auction system through completing 15 rounds of auctions and questionnaires. Based on their feedback about the system and the experimental procedures, we modified the experimental instructions and the number of questions, and resolved system bugs. All participants in the pilot tests were able to detect the two visually clear independent variables: buyout permanence and price contrast.

Participants

All the experiments were carried out in a public university. The recruitment emails specifying that basic computer proficiency was necessary were sent to all third-year IS major undergraduates. All respondents were recruited into the pre-experiment briefing and were asked to answer five questions based on their understanding of the various buyout options, experiment rules, and auction features after they were introduced to online auction. Those who failed to answer correctly all the five questions were turned away. In total, 128 undergraduate students (59 females and 69 males) who had no prior experience of laboratory experiment proceeded to participate in the between-subject, repeated-auctioning experiments. This led to 16 participants per treatment group. Their average age was 21.48 years old. As part of their degree requirements and coursework, all participants had had Web-surfing and computing experience. Table 2 details the descriptive statistics of respondents' characteristics.

Table 2. Descriptive Statistics of Respondents' Characteristics

Measure	Items	Frequency	Percentage (%)
Auction Experience	Female	59	46.1
	Male	69	53.9
Familiarity with auction rules	Poor	61	47.7
	Modest	48	37.5
	Good	16	12.5
	Expert	3	2.3
Auction Knowledge	None	28	21.9
	Less than 1	15	11.7
	1 to 2	26	20.3
	2 to 3	21	16.4
	More than 3	38	29.7
Risk seeking	1 – Risk adverse	3	2.3
	2	25	19.5
	3	49	38.3
	4 - Neutral	17	13.3
	5	24	18.8
	6	8	6.3
	7 – Risk seeker	2	1.6

All the participants were told during recruitment and reminded during the briefing that this was an experiment in individual decision-making and they would be paid in cash immediately after the experiment. It was also pointed out that higher payments were possible based on performance, but not guaranteed. The participants were given monetary incentives consisting of both fixed and variable amounts, which encouraged them to execute the experimental tasks seriously. The variable amount was computed based on the participant's returns (i.e., surplus gained from the auction). On average, each participant was paid USD\$10 for an hour's work.

Experimental Procedure

The participants were randomly assigned to groups to minimize the possibility of individual characteristics affecting the results. Participants were given the scenario of acquiring commodity products and were primed to shop at an online auction Web site. After reviewing the instructions, each participant logged on to the system and completed a demographic questionnaire. In the same questionnaire, five questions were asked to test their understanding of the types of buyout options and the price parameters. Anyone who answered wrongly was disqualified from further participation. A simple tutorial on the interactive system and two trial-trading periods for familiarization were conducted. The participants were not allowed to communicate during the experiment. They were also advised that their monetary reward would depend on their performance.

Each participant completed 20 actual trading periods. In each period, the system randomly presented one combination of price parameters (i.e., buyout price, starting price, and average clearance price) to participants. Sequence effect was controlled. The sequence was predetermined to offset any possible confounding sequence effect. Each trading period lasted no more than 90 seconds.

Each participant was given the option to buy out at the prevailing buyout price or bid from the starting price. When a participant chose to bid and inputted an offer price, the proxy bidding system placed bids based on the minimum bid increment and up to the offer price delineated by the participant. Throughout the auction, the participant was able to see whether the reserve price had been met by any buyers in the auction. The buyer would be alerted when the status of the reserve price changed from "*Reserve price yet to be met*" to "*Reserve price met*". The system would also inform the buyer when she was outbid and prompted her to enter another offer price. The auction was automatically extended if a new bid was placed during the last 10 seconds. An auction terminated when there was no new bid received for a period of 10 seconds. This auction ending rule was identical to the online auction implementation in most of the online auction Web sites such as eBay.

Participants were led to believe that they were bidding against many other buyers. In fact, simulated buyers were used to randomly bid (or buyout) against each participant to keep buyer behavior constant (Walker et al. 1987). The

difference between the buyer's valuation⁵ and the closing price was recorded as his or her surplus if he or she won. The participant was awarded zero surpluses for failure to win the bid. Upon the completion of 20 periods, the system computed and recorded the amount of money earned by the participant, and the cash reward was be duly disbursed to him or her.

Data Analysis

Manipulation Checks

Checks were done to ensure that our manipulation on price contrast and buyout permanence were successful. Reserve price was not verified, as it was not visually evident to the participants. Price contrast manipulation was checked by asking the participants to rate on a 7-point Likert scale of how close the buyout price is to the average clearance price. A nonparametric Mann-Whitney U test comparing the mean (standard deviation) ratings obtained from the low and high price conditions (i.e., 2.56 (.934) and 5.17 (.547) respectively) is highly significant ($z = -46.485$, $p < .01$). Buyout permanence was verified by asking the participants to rate on a similar Likert scale of how long the buyout option was available for selection during a period. A nonparametric Mann-Whitney U test comparing the mean (standard deviation) ratings obtained from the temporary and permanent buyout conditions (i.e., 2.00 (1.016) and 5.56 (.950) respectively) is highly significant ($z = -44.438$, $p < .01$). Collectively, from this analysis, our primary manipulations of price contrast and buyout permanence were deemed successful.

Controls for State Dependence

Prior research has observed a substantial persistence across purchase decisions in experiments (Keane 1997). In particular, a buyer's decision in the current period could be dependent on the returns from the previous period earnings and the decisions made in prior periods. Furthermore, it is highly plausible that a buyer would become more adept as the experiment progresses. In this light, to control for state dependence (i.e., influence of outcome and decision of previous period on current period) and learning effects, we need to control for previous period earning, prior period decision, and current period number (experiment stage). As only in period 2 will we be able to obtain previous period earnings, only 19 rather than 20 periods are used for hypothesis testing. This move also further minimizes begin-game variance due to unfamiliarity despite having two pre-trial periods prior to the experiment.

Another two variables that were controlled for state dependence were the buyer's valuation of the product on sale and the risk propensity that each participant exhibits. To minimize the effect of the valuation price, all valuations were based on a fixed percentage of the buyout prices that they were each associated with. In this study, all valuations were predetermined at 120% of their associated buyout prices (e.g. if the buyout price of a product was at \$400, the valuation would be \$500). Risk propensity was managed by measuring each participant's risk propensity and using the data as covariate during data analysis. The method of measuring the participant's risk propensity was to ask the participants to rate on a 7-point Likert scale of how concerned they would feel about making a potential loss from a poor choice.

Hypothesis Testing

The effects of the manipulated variables on decisional choice (i.e., decision to buy out during the first decision, decision to buyout during the auction, and decision to bid throughout a period) were examined by estimating a nested logit model on the overall choice model and a conditional logit model on the decision to buy out during the first decision.

By clustering choice for decision after the first decision has been made, the nested logit model overcomes the independence from irrelevant alternatives problem when analyzing alternatives that are similar within a group (first decision made) but different from the other group (i.e., subsequent decisions made). For the analysis here, we assume the buyer decision process to consist of choices to be made from the available alternatives in two stages: (1) whether to

⁵ All participants went through two price categories – three-digit items (e.g. \$120) and two-digit items (e.g. \$50). Valuation price for each combination of the buyout price, average clearance price, and bid increment was predetermined.

buy out when the auction starts, and (2) whether to buy out during the auction. Figure 2 depicts the structural view of the decision tree.

For the buyout choice during the first decision, we estimated a conditional logit model with the dependent variable as buyout decision (yes/no) and the independent variables consisting of buyout permanence (0 – temporary; 1 – permanent), price contrast (0 – low; 1 – high) and reserve price (0 – low; 1 – high). In addition, we also included the variables of current valuation, risk propensity, previous period earning, previous period decisions, and time period dummies as control variables in the conditional logit model of buyout in the first decision.

For the buyout or bid choices in the overall choice model of both the first and subsequent decisions, we set up and estimated a nested logit model to investigate the effects of the manipulated variables on buyout or bid choices in subsequent decisions. Similar to the conditional logit model for the first decision, we included the manipulated variables of buyout permanence, price contrast, and reserve price (interacted with subsequent decisions' buyout and bid choice dummies) as the independent variables for the subsequent decision nest in the nested logit model. The interaction of the manipulated variables with the buyout and bid dummies was necessitated due to the theoretical setup of the nested logit model and the need for variation in the independent variable values across the buyout or bid choices in the first and subsequent decisions. For the first decision nest in the nested logit model, we used the control variables of current valuation, risk propensity, previous period earning, previous period decisions, and time period dummies as explanatory variables for the first decisional choice.

Table 3 lists the descriptive statistics of choice made, while Tables 4 and 5 depict the results of estimating the conditional logit and nested logit models.

Figure 2. Decisional Choice

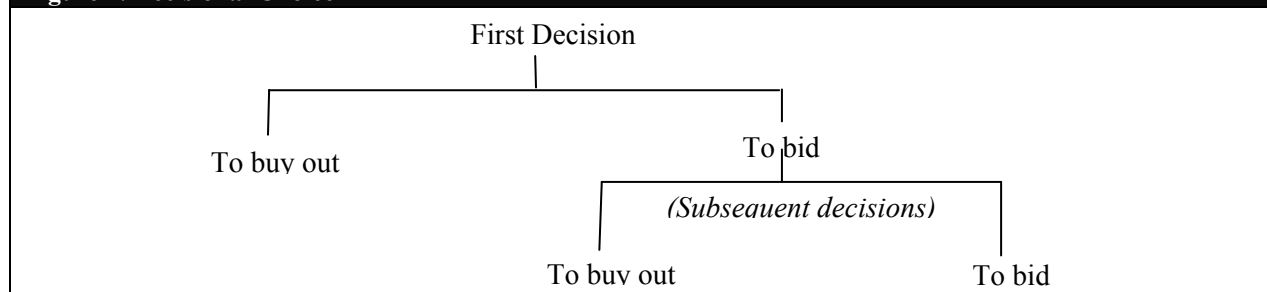


Table 3. Frequency Distribution of Choice Made				
Price Gap	Reserve Price	Decisional Choice		
		1 st decision to Buy out	Subsequent decision to buy out	Decision to bid throughout
Temporary buy out				
Small	Low	72 (23.7%)	32 (10.5%)	200 (65.8%)
	High	94 (30.9%)	29 (9.5%)	181 (59.5%)
Large	Low	81 (26.6%)	10 (3.3%)	213 (70.1%)
	High	118 (38.8%)	17 (5.6%)	169 (55.6%)
Permanent buy out				
Small	Low	206 (67.8%)	14 (4.6%)	84 (27.6%)
	High	182 (59.9%)	55 (18.1%)	67 (22.0%)
Large	Low	196 (64.5%)	36 (11.8%)	72 (23.7%)
	High	202 (66.4%)	32 (10.5%)	70 (23.0%)
Buyout				
Temporary		365 (30.0%)	88 (7.2%)	763 (62.7%)
Permanent		786 (64.6%)	137 (11.3%)	293 (24.1%)
Price Gap				
Small		554 (45.6%)	130 (10.7%)	532 (43.8%)
Large		597 (49.1%)	95 (7.8%)	524 (43.1%)
Reserve Price				
Low		555 (45.6%)	92 (7.6%)	569 (46.8%)
High		596 (49.0%)	133 (10.9%)	487 (40.0%)

Table 4. Conditional Logit Model of first decision (i.e. buy out: yes/no)			
Variable name	Estimate	Standard error	Z
Independent variables			
Permanent buyout	1.321***	0.097	13.670
High price contrast	0.238**	0.095	2.510
High reserve price	0.154*	0.088	1.750
Control variables			
Valuation	-0.0003	0.0003	-1.040
Risk propensity	0.052	0.036	1.440
Previous period earning	-0.003***	0.001	-3.010
Previous period decision (buyout: first)	0.481***	0.101	4.740
Previous period decision (buyout: subsequent)	-0.323*	0.166	-1.940
Period dummies (for Period 3 to 20)	Model parameters estimated but not shown		
Auxiliary statistics		At convergence	
Model log-likelihood		-1495.211	
Model LR: chi-square (df)		374.09 (26)***	

* - significant at 0.10; ** - significant at 0.05; *** - significant at 0.01

Evaluating the statistical significance of the estimated conditional and nested logit models (see Tables 4 and 5), we find that our proposed models estimated using the independent and control variables are significant in terms of the model likelihood ratio tests. In addition, the likelihood ratio test of homoskedasticity in the logit random error terms across decision nests in the nested logit model shows that homoskedasticity is rejected, and thus our use of the nested logit model for modeling the overall decisional choice is justified.

From Tables 4 and 5, the model estimation results suggest that a buyer is more likely to choose buyout if the buyout option is set as permanent in both the first and subsequent decisions. On the other hand, for the manipulated variable of price contrast, the estimation results show that a high price contrast is associated with a high propensity to buy out in the first decision. However, there is no significant relation between price contrast and the propensity to choose buyout in subsequent decisions. Lastly, for the case of reserve price, our estimation results show that a high reserve price is

marginally related to a high propensity to choose buyout in the first decision, while it is significantly related to a high propensity to choose buyout in subsequent decisions.

Table 5. Nested Logit Model of subsequent decision (i.e. buy out versus bid)

<i>Variable name</i>	<i>Estimate</i>	<i>Standard error</i>	<i>Z</i>
Independent variables (in nest/branch for subsequent decisions)			
Dummy for buyout option	-1.333***	0.115	-11.570
Dummy for bid option	-0.352***	0.064	-5.480
Permanent buyout * Buyout dummy	0.821***	0.158	5.200
High price contrast * Buyout dummy	-0.183	0.119	-1.540
High reserve price * Buyout dummy	0.395***	0.110	3.600
Permanent buyout * Bid dummy	-0.559***	0.144	-3.890
High price contrast * Bid dummy	-0.015	0.033	-0.450
High reserve price * Bid dummy	-0.149***	0.046	-3.270
Inclusive value (subsequent decisions nest)	4.658**	2.101	2.220
Control variables [* Buyout dummy] (in nest/branch for first decision)			
Valuation	-0.0003	0.0003	-1.070
Risk propensity	0.079**	0.037	2.150
Previous period earning	-0.003***	0.001	-2.760
Previous period decision (buyout: first)	0.461***	0.102	4.520
Previous period decision (buyout: subsequent)	-0.310*	0.166	-1.860
Period dummies (for Period 3 to 20)	Model parameters estimated but not shown		
Auxiliary statistics		At convergence	
Model log-likelihood		-2036.030	
Model LR: chi-square (df)		1271.59 (32)***	
LR test of homoskedasticity: chi-square (df)		5.06 (1) **	

* - significant at 0.10; ** - significant at 0.05; *** - significant at 0.01

In terms of the control variables, as a post-hoc analysis, we find that buyers' valuation does not have an influence on decisions to buyout or to bid in the first decision. Interestingly as expected, we observe in terms of risk-taking propensity, buyers who are generally risk-averse have a higher propensity to choose buyout in the first decision. In addition, a higher level of earnings in the previous period seems to be related to a lower propensity to buyout in the first decision. Finally, there seems to be significant evidence of inertia or state dependence in the buyers' choice of buyout decisions across periods in the auction experiments.

In conclusion, to summarize the results of our hypotheses tests, H1 is supported, H2 is not supported, and H3 is partially supported (H3a is not supported and H3b is supported).

Discussion

Discussion of Findings

This research represents an extension of prior research on buyout options (e.g. Tan et al. 2005) by investigating the impact of the buyout permanence (*temporary* and *permanent*) on buyer behavior with explicit considerations of the reserve price and average clearance price. Furthermore, this study signifies a more complete understanding of buyer decision-making by considering both the first decision and the subsequent decisions to buy out.

Our results suggest that the static nature of the *permanent* buyout constitutes a threat to buyers to the extent that they are willing to buy out as soon as possible to prevent premature ending of an auction. The significant influences of buyout permanence on first decision (i.e., first auction trading period) and subsequent decisions (i.e., subsequent auction trading periods) to buy out have provided evidence to support our conjecture that buyout permanence is positively related to the propensity to buyout. In addition, it adds credence to the then-counterintuitive findings made by Tan et al (2005). Particularly, our result is in accordance with the observation of Tan et al. (2005) that buyers with

permanent buyout options have a higher propensity to buy out at the first decision. We further add to Tan et al. (2005) that even when the first decision is not to buyout, the presence of *permanent* buyout option could prompt the buyers to exercise buyout eventually compared to the *temporary* buyout option.

The results on the influence of reserve price partially support the hypothesis that reserve price is positively related to the propensity to buy out. We observe a significant positive relationship between the level of the reserve price and the decision to buy out in subsequent decisions. However, the level of reserve price does not significantly influence buyout decisions in the first period. While it is obvious that a high reserve price should mean a smaller surplus that can be earned through bidding, the buyers are limited by their ability to detect the level of the reserve price at the beginning of an auction period. In other words, buyers are only able to better estimate the reserve price as the action progresses. Depending on the amount chosen as the maximum bid amount in the first decision to bid, the reserve price could be estimated to be high or low when compared to the average clearance price and/or buyout price. Hence, this observation supports our deduction for the effect of reserve price in subsequent decisions, although the effect of reserve price on the first decision is not pronounced. Without any reliable indicators to the level of reserve price, buyers are ambivalent as to whether to buy out or to bid when they just enter an auction.

Comparatively, the results on the influence of the price contrast between the buyout option and the average clearance price are counter-intuitive. We note that Tan et al (2005) define price contrast as the price difference between the starting price and the buyout price, and they observe that a high price difference is sufficiently conducive to lead buyers to bid. The study assumes that a seller is willing to liquidate an item as long as the price is at or above starting price. In this study, we define the minimum price that the seller is willing to sell the item to be the reserve price. Despite the difference in the operationalization of the price difference, our study provides further empirical support that regardless of whether a buyer contrasts the buyout price with starting price (i.e., in the absence of reserve price) or an estimated reserve price (in this case, the starting price is usually at very low price), one is more likely to bid if the price contrast is large. Adding to this, we observed that a buyer in an attempt to earn maximum utility would strive to discover the reserve price. In the first decision where there is a lack of indicators as to what the reserve price may be, a buyer would attempt to rationalize as to where the reserve price is likely to be with respect to the other price parameters (i.e., buyout price). To better estimate the reserve price, it is logical for a buyer to first assume that the reserve price is below or equal to the buyout price. With the average clearance price as a convenient reference point, a large gap between the average clearance price and the buyout price would mean that the reserve price is more likely to be above the average clearance price than below it. In this sense, buyout strategy is preferred. On the other hand, the buyout price may not seem to be that great a bargain if there is a small price difference between the average clearance price and the buyout price.

The fact that the effect of price contrast is not significant for the subsequent decisions adds weight to the explanation that buyers are reserve-price conscious due to their focus on maximizing their surplus. Particularly, in subsequent decisions (i.e., from period 2 onwards), the information gleaned from the first decision to bid would yield more meaningful information about what the reserve price would be. In this situation, the difference between the current price and the buyout price would be a better indicator as to what the reserve price is likely to be compared to the price contrast between the average clearance price and the buyout price. This is especially true when buyers bid at a price greater than the average clearance price, thereby making the price contrast less useful in determining what the reserve price is likely to be.

Limitations

Before we discuss the implications of this study, it is imperative that we acknowledge its limitations. First, the findings could be limited by the degree of realism in the experiment due to the use of students as participants. However, prior studies comparing the use of students and practitioners as subjects could not find sufficient evidence indicating a difference in the results between the two groups of participants (Holt and Issac 2002). Hence, we believe that the choice of students as experiment participants was appropriate and the results should be able to shed light on the impact of buyout.

Second, this study focuses on two rather than three of all the buyout options available in the market. Hence, readers must be cautious when comparing results across studies (e.g. Tan et al. 2005). Particularly, this study focuses on the situation where starting price is set at a ridiculously low level in accordance to a reserve pricing strategy stated by Lucking-Reiley (2000). With this strategy, a seller is keen to set a low starting price to generate bidding momentum while protecting the interests of the seller via the reserve price mechanism. The artificially low starting price in this study may overly influence buyers to pursue a bidding strategy even under circumstances where such a strategy is not

optimal (e.g. when a high reserve price is expected). The impact of the low starting price on the decision-making process of buyers cannot be ignored and must be seriously taken into consideration when comparing studies, which do not study reserve price in conjunction with buyout options.

Third, the focus of this study is exclusively on the observed measures. Prior research on consumer choice reveals that the construction of emotions has a great influence on the decision of the consumer (Shiv and Huber 2000). Depending on the types of emotions, the buyer may be moved to adopt decisions that may not even maximize the expected value of her decision (Cooke, Meyvis and Schwartz 2001). From the buyer's perspective, the dilemma of choosing between an alternative that provides a certain but less profitable outcome (buyout) and another alternative that is uncertain in its outcome but may be potentially more rewarding (bidding) may induce emotions that could affect the decision-making itself. To this end, constructs such as satisfaction or regret can be measured to better understand a buyer's behavior. In this light, future research investigating the interacting influence of starting price, buyout option, and reserve price on buyer behavior should pay particular attention to the constructs of emotions.

Fourth, our research is limited in that we consider the bidders' response to buyout options under selected auction pricing parameters. Other factors, such as the product type (e.g. utilitarian and hedonic), duration of the auction, seller ratings, degree of attractiveness of the auctioned item, and intensity of bidding, could affect bidders' propensity to buy out (Lucking-Reiley 2000). Future research may take into consideration these factors.

Last, prior analytical studies indicate that the inclusion of buyout option may raise the overall revenue of the sellers (Budish and Takeyama 2001; Gupta and Gallien 2005). While this study seeks to complement prior researches by focusing on the decisional choice of the buyers, future empirical study could be conducted to investigate the influence of buyout options on seller revenue, buyer return, and overall market surplus.

Implications

This study complements the prior research (e.g. Bertomeu and Mathur 2006; Mathews and Katzman 2006; Tan et al. 2005) by explicitly embedding the reserve price when investigating buyout option. For instance, in an attempt to maximize their surplus, buyers would need to determine how much additional surplus could be earned through bidding rather than choosing buyout straight away. To determine the amount of additional surplus possibly earned through bidding, the reserve price or at least an approximation of the reserve price needs to be ascertained. It appears that buyers are value-maximizing in their behavior, and they adopt a simplistic view of assuming that a large price gap between the average clearance price and the buyout price would be more likely to encapsulate the reserve price than a smaller price gap. This view of relating the price gap to the reserve price is weak as it gets abandoned by the buyers themselves once the buyers are able to better estimate the reserve price by launching at least one bid in the auction.

This study investigates not only the first decision but also the subsequent decisions. An interesting observation was noted that with the exception of buyout permanence, other auction parameters that we investigated, such as the reserve price and the price contrast between the average clearance price and the buyout price, have different impacts on the buyer in their first decisions and subsequent decisions. Specifically, when a buyer is not able to estimate the true value of the reserve price at the beginning of an auction, one would rely on the visible, accessible pricing parameters (i.e., buyout price and average clearance price) to make buyout decision or even gauge the reserve price. However, as the auction progresses, a buyer is able to estimate the actual value of the reserve price leading to a significant influence of this price on subsequent decision. In this light, if the study had been restricted to examining the influence of these auction parameters on the buyers' first decisions only, the understanding of the influence of the parameters have on the decision-making process of the buyer would have been less rich. It is common that the same parameters do not necessary influence the buyer consistently throughout the decision-making process. Hence, it is imperative to highlight that future research should explicitly consider decision-making in auctions as a multi-stage process.

Prior studies on auctions seldom go beyond the contextual auction parameters delineated by the seller (see e.g. Mathews and Katzman 2006; Lucking-Reiley 2001). This is might be a concern, as often the buyers may not only build their expectations based on what is provided in an auction. They often rely on external sources (e.g. prices in retail stores) for information to form a reference point as to what constitutes as a fair value of the product. In our case, we consider this by explicitly specifying an average clearance price for each product in the experiment so that the participants may form a perception of what the "market price" is for each product. It is clear from our results that reference price plays an indirect part in the buyers' decision making, as it is used to speculate what the reserve price is likely to be prior to the buyers' first decisions. Future research in online auction should allow for the consideration of

reference price, as most buyers do not go into an auction without at least some idea as to what the value of the product is.

In addition to the theoretical contributions, this study offers several suggestions to the auction sellers and buyers. For the sellers, they have to be aware of the existence of external reference price information that buyers could easily obtain. In this regard, sellers have to be cautious of not only what is being evaluated based on the auction parameters delineated but also external information that may shape the buyers' decision. As espoused by Lucking-Reiley (2000), a strategy of a starting price low with a reserve price may be a plausible strategy for sellers to generate bidding activity, but buyers may not take the bait. As seen in an empirical study by Katkar and Lucking-Reiley (2001) of a Pokemon field experiment in eBay, a secret reserve price with a low starting price is actually less attractive than having no secret reserve price and setting the starting price as the seller's minimum selling price. Essentially, reference price does play a part in a real-life auction scenario as demonstrated by our findings and those by Katkar and Lucking-Reiley (2001).

Another practical implication of the study is that both sellers and buyers must recognize the impact that various auction parameters have on buying behavior (Pinker et al. 2003), especially the counter-intuitive findings made by Tan et al (2005) and this study. Buyers are understood from these findings to be loss-averse and very conscious of the potential surplus they can earn which is limited by the reserve price. Failure to recognize this would lead to missed opportunities to gain greater utility from their decisions, particularly sellers who may use the counter-intuitive findings to take advantage of the online auction buyers who are generally unaware of the finer points in buyout auctions.

Conclusion

Buyout option offers a buyer the opportunity to bypass the hassle of bidding and obtain the item immediately at the posted price. Given its face benefits, the buyout option will continue to be a key feature of online auctions. This study has provided a methodological examination of the impact of buyout options on buyer behavior. Particularly, we take into consideration the reserve price and externally available information (i.e., average clearance price) when investigating the influence of buyout options on buyer behavior. We believe research on buyout option deserves and continues to draw attention from the academia not only because of its research implications, but also for its practical contributions toward making online auctions a success. In this light, we hope that our research has helped to contribute to a richer understanding of consumer response to buyout options.

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